

UNIVERSITY OF ILLINOIS, Agricultural Experiment Station.

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BULLETIN NO. 25.

FIELD EXPERIMENTS WITH CORN, 1892.

This bulletin gives the results of some experiments with field corn in 1892, together with a summary of the results obtained in the same experiments in 1888, 1889, 1890, and 1891.

The following are reported:

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| No. 1. Test of varieties. | No. 3. Time of planting. |
| No. 4. Depth of planting. | No. 5. Thickness of planting. |
| No. 6. Planting in hills or drills. | No. 8. Frequency of cultivation. |
| No. 9. Depth of cultivation. | No. 10. Effect of root-pruning. |
| No. 89. Cross fertilization. | No. 134. Effect of removing tassels. |
| No. 90. Growth of the corn plant; increase of its dry matter. | |

SUMMARY.

The experiments were tried on the dark colored, fertile, prairie soil common to central Illinois. The surface soil is about 18 inches deep, underlaid with yellow clay. In most cases the land had been in wheat or oats in 1891, and was plowed in the spring. The corn was planted by hand, covered with a hoe, generally with four kernels in hills 3 ft. 8 in. apart each way.

The season was exceptional in its character. The rainfall was excessive in May and June; below an average later in the season. For the five months—from May to September—it was 19.08 in., the average for this portion of the year being from 18 to 20 in. The average mean temperature for these five months was 67.4°, which is below the average during a series of years.

TEMPERATURE AND RAINFALL DURING THE CORN SEASON OF YEARS NAMED.

<i>Mean temperature, F.</i>						
Year.....	May.	June.	July.	August.	Sept.	Average.
1887.....	67.9°	73.6°	80.4°	75.2°	66.4°	72.7°
1888.....	59.4°	71.3°	77°	72.4°	62.4°	68.5°
1889.....	59.2°	65.5°	72.7°	69.2°	61.3°	65.6°
1890.....	58.3°	74.6°	73°	68.7°	60.5°	67°
1891.....	58.4°	72°	70°	70.2°	69.2°	68°
1892.....	57.9°	70.6°	73.3°	71.5°	63.9°	67.4°
Average, 1878-87.....	64.6°	71°	77.5°	74.6°	66.5°	70.8°
<i>Rainfall, inches.</i>						Aggregate
1887.....	3.84	1.62	1.65	2.56	3.68	13.35
1888.....	6.84	5.75	5.34	3.14	1.95	23.02
1889.....	5.52	6.81	5.84	.6	2.74	21.51
1890.....	3.56	3.8	2.83	1.93	1.19	13.31
1891.....	.89	2.08	1.41	2.86	.41	7.65
1892.....	7.86	5.36	2.5	2.43	.93	19.08
Average, 1878-87.....	4.45	5.04	2.75	3.45	3.27	18.96

Seventy-eight samples of corn, with different names, were tested on contiguous plats, each one-fortieth of an acre in extent. For the first time in five years, the late varieties gave the largest average yields, nine such varieties averaging 70 bu. Sixty-seven plats of medium maturing varieties averaged 68 bu.; sixteen plats of early maturing varieties averaged nearly 53 bu. For five years past, each of four medium maturing varieties has given yields of from 71 to 76 bu. per acre. The best early maturing variety has given in the same time average yields of 65 bu. per acre. For three years past the best yield by any variety was 83 bu. per acre, by Boone county white. The largest yield in 1892 was almost exactly 100 bu. per acre of air-dry corn, of the variety known as Piasa queen—a variety maturing too late for central Illinois. The trials for six years indicate that the larger medium maturing varieties give the best results. Among these the Boone county white, champion white pearl, and Burr's white represent the most satisfactory type of white, while the Leaming has given the best results among the yellow varieties. The Murdock has given the best yields of any early maturing variety, 65 bu. per acre, for five years.

Excellent varieties were obtained from many different places. Extravagant claims, such as yields of 100 bu. per acre under ordinary cultivation, or that any variety worth cultivating matures in 80 or 90 days, when planted at the usual time, are not to be accepted

as correct. In ordinary circumstances, 100 days from date of planting may be considered as a minimum for field corn to mature fully; late varieties often need 150 days in central Illinois.

Repeated trials have uniformly shown that larger yields of both corn and stalks are obtained by planting a larger number of kernels than is customary in the best practice of Illinois. From 12,000 to 13,000 kernels planted per acre seem to be the minimum for largest yields at the Station grounds. This is equivalent to 4 kernels per hill, in rows at the usual distances for planting in Illinois. In most of the trials the rows were 3 ft. 8 in. apart each way. Twenty-four varieties were planted in as many plats; half of each having 3 kernels, and half 4 kernels in each hill. In 21 of the 24 cases, the larger yields were obtained from the thicker planting, the average increase for the 24 plats being about 4.5 bu. per acre.

Repeated trials have shown that, if other conditions are the same, there is no perceptible difference in average yield, whether the corn is planted in hills or in drills, the number of stalks secured influencing this rather than their mode of distribution. In many cases it is more difficult to keep drilled corn free from weeds. To secure the largest yield of both corn and stalks, medium maturing varieties may be planted at the rate of one kernel to each 3 inches, in rows 3 ft. 8 inches apart. Thick planting gives smaller ears, which increase the labor in husking. Where the corn is to be fed without husking, the smaller size of the ears may be an advantage.

As in each of several previous years, trials in 1892 show that shallow cultivation is better than deep, and that more frequent cultivation than is necessary to keep the soil free from weeds, and the surface fairly loose, is not profitable. On the Station grounds weeds were the chief enemy to the corn plant. Fair yields of corn have been secured in each of several years without any cultivation after planting, other than scraping the surface with a sharp hoe. Root-pruning has uniformly decreased the yield.

In 1892 the largest yields were obtained from planting April 30th, the soil being in better condition than at the later plantings. The average results for five years show no great variation in the yield of medium maturing varieties, planted at any time during May. The earlier plantings have required more cultivation than the later ones. Within reasonable limits, time of planting seems to have less influence on yield than the condition of soil at time of planting.

In each of five cases, the yield from plats planted with cross-bred corn was larger than the average yield of the plats planted with the varieties which had been crossed; the average increase was over 9 bu. per acre. In four out of five cases plats planted with mixtures of different varieties of corn gave a less yield than the average of the plats planted with the same varieties separately, the average decrease being 3.7 bu. per acre.

A medium sized, medium maturing variety, planted June 3d, reached its maximum height August 19th, 77 days from planting. The dry matter continued to increase until the corn was fairly mature, September 16th. It had but little more than one-half the total quantity of dry matter when the stalks had reached their greatest height, and not more than one-third when tasseling began. In the week from July 22d to 29th, there was a growth of 28 inches, or 4 inches per day.

No noticeable effect on yield was produced by removing tassels from alternate rows.

Trials at the Station show that the corn grown last year on the University farms, at Champaign, has less vitality than corn kept under like conditions any year for the last ten. Early maturing varieties show nearly perfect vitality; but not more than 80 to 85 per cent of the kernels of medium maturing varieties germinated under conditions more favorable than ordinarily met with in field planting.

Experiment No. 1. Corn, Testing Varieties.

Tests of varieties of dent corn have been made for six years, reports of which will be found in bulletins No. 4, 8, 13, and 20.

The land used in 1892 had been in wheat in 1891 and was seeded with clover. Barnyard manure was applied at the rate of about thirty loads per acre, and May 10th, after the clover had made considerable growth, the ground was plowed. Heavy rains prevented further preparation and planting until May 24th and 25th. The corn was dropped by hand in checks 3 ft. 8 in. apart and covered with a hoe.

The plats, 130 in number, were each one-fortieth of an acre, 2 rods or 9 hills square, and were so planted that corn was growing on every side. There were two plats of each of 24 varieties, one plat being planted three kernels per hill, and the other 4 kernels per hill. The remainder of the plats were planted 4 kernels per hill. June 10th to 28th they were all cultivated three times with a surface cultivator known as "The Superior." July 13th and 14th the remaining weeds were removed with a hoe. Just before cultivating the first time the number of hills and plants was ascertained for each plat. Frequent observations were made as to time of ripening. The number of barren stalks and average height to tip of tassels and to butt of ears were ascertained for each plat. The early varieties were husked Sept. 5th, the medium ones at several subsequent dates, and the late ones Oct. 11th. The plats were husked by thirds, the weight and number of ears being ascertained for each third. The middle third of each plat was at once shelled, the number and weight of both good ears and nubbins and the weight of both shelled corn and cobs being ascertained. A pint jar of the shelled corn from each plat was sent to the laboratory for the determination of water. Eleven per cent is taken as the average content of water in air-dried corn.

DUPLICATE PLATS.

While the attempt was to have uniform soil and like treatment throughout, the differences in yield, as in former years, of plats planted with the same variety is considerable. There were four plats of each of the two varieties, Leaming and Murdock. The greatest difference in yield per acre between any two plats of the same variety was Murdock 11.9 bu., Leaming 18.9 bu.; the average difference, Murdock 6.3 bu., Leaming 11 bu.; and the least difference, Murdock .9 bu., Leaming .6 bu.

These differences, though considerable, are much less than those found between different varieties of even the same class. For example, the greatest difference between two plats of the 16 planted with early maturing varieties is 32 bu. per acre; of the 67 medium maturing, 43.4 bu.; and of 9 late maturing 39.5 bu. The variety giving the largest yield produced 2.9 times as much as the one giving the least.

When the variation in yield of different varieties does not exceed that of different plats of the same variety the results are inconclusive. A greater variation may properly be attributed, in part at least, to the variety. If single plats are used, it is only after varieties have been tested for a series of years that we can conclude which are the most prolific; but other things can be ascertained in a single year, such as time of maturity, size, ratio of ears to stalks, ratio of shelled corn to cobs, and the general characteristics of stalk and ear. If several plats, widely distributed over the tract, are used for each variety and the average yields ascertained, these form a better basis for a comparison of the varieties in respect to yield; for in this way the effect of differences in the condition of the test is much diminished.

YIELD PER ACRE OF AIR-DRY CORN UPON DUPLICATE PLATS, 1892.

Variety.	From whom received.	a.	b.	c.	d.	Average.
Murdock	W. T. Lamb	50.8	55	61.8	62.7	57.6
Leaming	T. Chester	60.5	61.7	78.8	79.4	70.1

LEAMING FROM DIFFERENT SOURCES.

The medium maturing yellow variety, well known as Leaming, was received from seven different sources. As the differences in yield, from seed from different sources, though considerable, were not so great as between different plats planted with seed from the same source, it cannot be said that the difference was due to the seed coming from different sources. There was, however, considerable difference in the shape and roughness of the ears obtained from seed from different sources, showing the effect of different standards of selection.

LEAMING, FROM DIFFERENT SOURCES.

Plat No.	Leaming.	Date of ripening.	Per cent of water in shelled corn when husked.	Yield per acre.	
				No. of ears.	Bu. air-dry corn.
*	T. Chester, Champaign.....	Sept. 27	19.3	9,560	70.1
42	E. P. Kellenberger, Godfrey, Ill....	" 21	25.7	11,200	72.4
43	John McCabe, Hammond, Ill.....	" 29	20.2	9,160	60.4
52	Currie Bros., Milwaukee.....	" 21	16.5	9,200	62.7
56	J. H. Beagley, Sibley, Ill.....	" 21	22.5	9,800	63.4
63	S. S. Dunseth, Forrest, Ill.....	" 21	15.9	10,840	74.1
68	University farm, Champaign.....	" 21	16.4	10,440	73.6

*Average 4 plats.

THREE KERNELS COMPARED WITH FOUR KERNELS PER HILL.

In only three out of twenty-four comparisons, with as many different varieties, between planting three and four kernels per hill, did three kernels give the larger yield. The average yield was 4.4 bu. per acre in favor of planting four kernels per hill.

COMPARISON BETWEEN 3 AND 4 KERNELS PER HILL, 1892.

Plat No.	Name of variety.	3 kernels per hill.			4 kernels per hill.		
		Total No. ears per acre.	Wt. 100 ears lbs.	Yld per acre air dry corn bu.	Total No. ears per acre.	Wt. 100 ears lb.	Yld per acre air dry corn bu.
4-5	Leaming	6760	58	54.3	8440	52	60.5
9-10	Pride of Kansas.....	7760	66	63.9	9160	57	63.4
14-15	Ivory dent.....	8160	68	72.9	13360	59	80.9
19-20	White surprise.....	6840	94	62.2	7960	84	60.3
24-25	Murdock.....	7960	46	49.1	10120	41	55
29-30	Baker's white.....	9040	40	52.1	10520	38	57.8
34-35	Bickerdike's early mammoth.....	8200	65	68	11520	52	70.6
39-40	Eclipse	7800	61	66.7	9640	52	61.2
44-45	Sterling.....	8040	60	65.8	9480	55	70.2
49-50	Clark's Iroquois.....	8480	57	70.2	10200	50	72.9
54-55	Pride of Columbia.....	8400	43	51.4	10840	38	58.5
59-60	California yellow.....	8200	61	70.3	10360	54	75.9
64-65	Clark's Onarga.....	9320	54	70.9	10960	52	77.4
69-70	Leaming	8120	69	74.6	10840	70	78.8
74-75	Branson's climax	8680	63	76.4	11360	51	77.5
79-80	Gibbs' yellow.....	8120	67	59.2	9600	61	75.1
84-85	Clarage.....	8480	53	59.5	10440	44	63.7
89-90	Blue River.....	7680	71	67.3	10320	53	68.9
94-95	Early Wisconsin.....	8200	48	51.6	7120	38	34.4
99-100	Clarke county champion.....	8400	51	55.4	10560	46	64.4
104-105	Dunlap's white.....	8800	68	71.8	11320	55	85.2
109-110	Edmonds.....	7760	58	56.7	9040	50	58.4
114-115	Pride of the north.....	8720	39	48.7	10280	36	54.2
119-120	Cloud's early.....	5960	70	51.3	7840	75	71.1
	Average.....	8078	59	62.1	10053	52	66.5

MIXTURES.

Four plats were planted each with equal parts of two varieties of corn, and one with equal parts of four varieties. The accompanying table gives the number of ears and bushels per acre for each variety planted separately, and their average as compared with the result of their mixture. In four out of five cases the mixtures gave smaller yields than the average of the varieties composing them. This may be due to the fact that there were fewer ears from the mixtures.

RESULTS OF MIXTURES, 1892.

Plat No.	Name of variety.	Yield per acre.	
		No. of ears.	Bu. air-dry corn.
91	Champion white pearl.....	10080	60.6
105	Dunlap's white.....	11320	85.2
	Average.....	10700	72.9
121	Mixture (a).....	9920	70.3
	Murdock (av. 4 plats) (Lamb).....	10500	57.6
110	Edmonds.....	9040	58.4
	Average.....	9770	58
122	Mixture (b).....	9680	59.1
	Leaming (av. 4 plats) (Chester).....	9560	70.1
65	Clark's Onarga.....	10960	70.9
	Average.....	10260	70.5
126	Mixture (c).....	9560	67.2
50	Clark's Iroquois.....	10200	72.9
43	Leaming (McCabe).....	9160	58.6
60	California yellow.....	10360	75.9
45	Sterling.....	9480	70.2
	Average.....	9800	69.4
127	Mixture (d).....	9240	62.1
27	Boone county white.....	10040	85.5
13	Piasa king.....	10240	79.7
	Average.....	10140	82.6
128	Mixture (e).....	9800	76.1

RESULTS FROM CROSS-BRED CORN.

Five plats were planted each from a different cross-bred ear. The accompanying table gives the date of ripening, number of ears, and bushels per acre for each parent, and their average, as compared with that of the cross. The first-named variety is in each case the female parent. In every instance the yield from the cross is greater than the average from the parent varieties; the average increase per acre from the five crosses being 9.5 bu. The fact that increased yields can be obtained by crossing two varieties is pretty certainly established, and a few farmers are changing their practice accordingly. This is quite easily done, by planting in one row one variety, and in the next another variety, and removing the tassels of the one as soon as they appear. The ears forming on the rows having the

tassels removed, will be fertilized with pollen from the other rows, thus producing a direct cross between the two varieties. The seed should be selected from the rows having the tassels removed, and the experiments indicate that it will pretty certainly give a larger yield than the average of the parent varieties, when planted under like conditions.

RESULTS FROM CROSS-BRED CORN.

Plat.	Variety.	Date of ripening.	Yield per acre.	
			No. of ears.	Bu. air dry corn.
22	Burr's white.....	Sept. 29	9960	64.2
82	Cranberry	" 29	9200	61.6
	Average.....	" 29	9580	62.9
117	Cross.....	" 29	7080	64.1
22	Burr's white.....	Sept. 29	9960	64.2
18	Helms improved	Oct. 11	10880	79.2
	Average.....	Oct. 5	10420	71.7
118	Cross.....	Sept. 29	11000	73.1
68	Leaming.....	Sept. 21	10440	73.6
8	Golden beauty.....	" 29	8280	65.1
	Average.....	" 25	9360	69.3
123	Cross.....	" 29	11520	86.2
91	Champion white pearl.....	" 29	11080	60.6
68	Leaming.....	" 21	10440	73.6
	Average.....	" 25	10760	67.1
124	Cross.....	" 21	8760	76.2
22	Burr's white.....	" 29	9960	64.2
110	Edmonds	" 21	9040	58.4
	Average.....	" 25	9500	61.3
125	Cross.....	" 21	10400	78.5

CLASSIFICATION OF VARIETIES.

The table on page 182 gives a classification of the varieties tested this year, and the yield of air-dry corn by each variety. It is based upon the time of ripening, color, and smoothness or roughness of the outer end of the kernels. Varieties maturing before Sept. 16th are classed as early; those maturing Sept. 16th to Sept. 30th, as medium; and those maturing after Oct. 1st, as late. The varieties that are very near the dividing lines as to time of maturity, and smoothness or roughness, are subject from year to year to change from one class to another, hence we see that the classification for 1892 differs slightly from that of 1891.

SUMMARY OF RESULTS WITH THE THREE CLASSES—EARLY, MEDIUM, AND LATE MATURING—FOR EACH OF FIVE YEARS.

	Av. of plats, 1888.			Av. of plats, 1889.			Av. of plats, 1890.			Av. of plats, 1891.			Av. of plats, 1892.		
	27 early.	32 medium.	15 late.	3 early.	42 medium.	22 late.	14 early.	29 medium.	8 late.	13 early.	19 medium.	6 late.	16 early.	67 medium.	9 late.
Per cent kernels germinating in apparatus.....	96	97	90	93	97	96	96	94	93	.....	.....	.....	.96	89	93
Per cent germinating in field....	84	80	74	70	68	65	81	86	81	87	88.4	87	91	87	85
Per cent full stand of stalks.....	88	87	85	84	80	78	79	83	79	86.1	86.4	84	81	82	80
Per cent of barren stalks.....	8	11	13	1.7	1.2	.5	10	12	13	10.4	12.6	14.8	8	9	10
Average height of stalks, feet....	9.8	11.5	12.2	6.9	8.9	9.9	8.1	9.6	10.1	6.8	7.7	8.6	8.1	8.8	10.2
Average height of butt of ear, feet.	4.5	5.5	6.2	2.8	4.2	4.7	3.5	4.5	5.2	3.4	4.2	4.3	3.7	4.3	5.4
Average length of 3 specimen ears, inches.....	8.3	9	9.7	7.4	8.1	9.6	8.1	8.3	8.4	7.6	8	7.5	7.7	8.4	8.8
Average circumference of 3 specimen ears, inches.....	6.3	7	7.2	6.2	6.4	7.2	6.4	6.6	6.2	6.2	6.6	6.2	6.1	6.6	7
Average circumference of 3 specimen cobs, inches.....	3.7	4	4.2	3.4	3.9	4.3	3.7	3.8	3.3	3.7	3.9	3.9	3.5	3.9	4
Number of good ears per acre....	7597	7482	6263	6520	6695	6055	5374	5292	4651	5464	6334	5112	5242	5438	5011
Number of nubbins per acre.....	2948	2741	2745	3360	3535	3840	3010	3749	3806	4088	3400	3400	4681	4473	4064
Total number of ears per acre....	10545	10223	9008	9880	10230	9895	8984	9041	8457	9552	9734	8513	9922	9858	9075
Weight of 100 good ears, lb.....	60	74	93	46	72	81	55	61.3	60.1	49.6	58.6	61.3	53	66	81
Weight of 100 nubbins, lb.....	35	33	51	26	40	43	28	31.9	34.1	28.5	31.6	33	25	35	47
Weight of 100 average ears, lb..	53	68	80	39	61	67	44	50	48.7	40.2	48.8	49.8	41	53	69
Pounds ear corn to make bushel when husked.....	67.2	68.4	71.4	66.1	69.6	72	66.2	67.2	67.1	*66.3	*69.3	*67.7	68.1	68.4	71
Pounds ear corn when husked to make bushel air dry.....	73.3	78.1	87.8	70.6	81.1	90.2	70.4	73.3	78	72	75.8	86.8	77.4	76.6	89.9
Yield per acre from good ears, bu.	67.5	84	81.2	45.8	68.8	70	44.5	50	47.1	.....	.....	.....	.....	.....	.....
Yield per acre from nubbins, bu.	15.1	18	20.4	13.5	19.7	22.2	14.8	17.7	18.5	.....	.....	.....	.....	.....	.....
Yield per acre, total when husked, bushels.....	82.6	102	101.6	59.3	88.5	92.2	59.3	67.7	65.6	*58.2	*69.9	*63.9	60	75.8	88.1
Yield per acre air-dry corn, bu.	75.6	89.8	83.2	55.6	75.4	73.5	55.6	62	56.6	56.1	66.1	57.4	52.8	68	70.2
Loss in drying per acre, bushels.	7	12.2	18.4	3.7	13.1	18.7	3.7	5.7	9	.....	.....	.....	7.2	7.8	17.9
Per cent of water in corn when husked.....	18.3	21.8	27.2	16.6	23.8	28.8	16.5	18.4	23.2	*14.3	*15.9	*20.3	21.6	20.5	29.3

* When shelled.

SYNOPSIS OF VARIETIES, 1892.

				Yield.	Av.
Corn.....	Early	Smooth..	Minnesota king.....	35.9	51.1
			Murdock	66.4	
		Yellow	Murdock.....	58.5	54.8
			Pride of Columbia.....	57.6	
			Thomas.....	63.1	
			Haber's early.....	47.9	
			Early Butler.....	45.2	
			Pride of the north.....	54.2	
			[Yellow variety, no name.]..	47.1	
		Mixed	Smooth ..	Pusey's cross-bred	37.3
	White.....	Smooth ..	Baker's white.....	57.8	48.9
			[White variety, no name.]..	49.6	
			Callaway's white.....	54	
			Early Wisconsin	34.4	
		Smooth..	Leaming.....	71.8	68.8
			Golden beauty.....	65.1	
			Pride of Kansas.....	63.4	
			Bickerdike's early mammoth	70.6	
			[Yellow variety, no name]...	77.8	
			.....	65.6	
			Woodhull.....	67.2	
	Medium.....	Yellow	[Yellow variety, no name]...	73.1	67.9
			Leaming	66.7	
			Farmer's interest.....	65.8	
			Fisk's yellow.....	60.1	
			Baker's yellow	63.9	
			Giant beauty.....	53.6	
			Golden beauty.....	61	
			B. O. E. ensilage.....	67.8	
			Eclipse.....	61.2	
			Early mastodon	49.6	
		Rough....	Sterling.....	70.2	67.9
			[Yellow variety, no name.]..	65.3	
			Clark's Iroquois.....	72.9	
			Log cabin.....	71.8	
			Chester county mammoth...	68.6	
			California yellow.....	75.9	
			Hughes.....	79.9	
			Clark's Onarga.....	77.4	
			[Yellow variety, no name.]..	81.7	
			Steward's improved.....	74.4	
	Mixed	Rough....	Second premium	83.8	58.9
			Prentice corn.....	59.7	
			Branson's climax.....	77.5	
			Legal tender	60.3	
		Smooth..	[Yellow variety, no name.]..	77.2	72.4
			Riley's favorite.....	74.1	
			[Yellow variety, no name.]..	75.1	
			Clarage.....	63.7	
			Queen of the field.....	42.1	
			Edmonds	58.4	
	White.....	Mixed	Munns.....	74.4	70.1
			90-day	62.3	
			Cloud's early	71.1	
			Leeper	57.1	
		Rough....	Calico.....	48.1	58.9
			Cranberry.....	61.6	
			Blue River.....	68.9	
		Smooth..	Hess white.....	74.4	72.4
			[White variety, no name.]..	76.8	
			Kansas branching .....			74
			Clarke county champion....			64.4
		Rough....		Clark's 110-day.....	60.9	70.1
			Burr's white.....	64.2	
			Boone county white	85.5	
			Champion white pearl.....	62.8	
			Irony dent.....	80.9	
			[White variety, no name.]..	81.7	
			White prolific.....	64.9	
			Ohio white dent.....	65.2	
			Early white dawn.....	64.8	
			Beard's pearl.....	54.9	
			Dunlap's white.....	85.2	

SYNOPSIS OF VARIETIES, 1892 — *Continued.*

				Yield.	Av.	
Late.....	{ Yellow	{ Smooth... {	Farmers' favorite golden....	69.7	82.5	
			{ Rough..... {	Farmers' favorite.....		65.3
				Piasa queen.....		99.8
	{ Mixed	{ Rough..... {	Ensilage corn.....	60.4	62.4	
			{ White..... {	{ Helms improved.....		79.2
	{ Smooth... {	White surprise.....				60.3
		Hickory king.....				47.9
		{ Rough..... {	{ Piasa king	79.7	47.4	
	Fisk's white.....			69.2		

RESULTS.

The number of plats in each of the three classes — early, medium, and late—and the results for each class for each of five years, are shown in the table on page 181. In each of the five years there has been an average of from four-fifths to seven-eighths of a full stand, *i. e.*, four stalks in each hill. In two years, 1888 and 1889, there were more stalks when the corn was ripe than when well up in the spring, showing that some stooling must have taken place. From the very low per cent of barren stalks in 1889 (1.5), we must conclude that most of the stalks produced by stooling must have borne ears. For 1888, 1890, 1891, and 1892, the per cent of barren stalks is comparatively uniform, averaging about eleven, and in each of these years it increases with the lateness of maturity.

Though varying much from year to year, owing to the nature of the season, in general the height of both stalks and ears increased with lateness of maturity, as do also the length and circumference of ears.

In general the weight of 100 ears has increased, and the number of ears per acre decreased with the lateness of maturing. The pounds of ear corn, as weighed when husked, which must be taken to make a bushel of air-dry shelled corn, invariably increases with the lateness of maturity. This is due largely to the fact that the per cent of water is greater in the late maturing varieties when husked. In two years of the five the pounds of ear corn as shelled required to make a bushel of air-dry shelled corn was less in the late maturing varieties than in the medium.

Each year, excepting 1892, the medium maturing varieties have made the largest yield; the average yield of air-dry shelled corn for the five years being 72.3 bu. per acre, which is 13.2 bu. more than the average of the early maturing, and 4.1 bu. more than that of the late maturing varieties.

Boone county white, a medium maturing variety, seed obtained from James Riley, Thorntown, Ind., has been tested for the past three years, giving an average yield of 83.1 bu. per acre. This is eleven bu. more than the average of any other variety tested during the same three years. In 1892, the largest yield, 99.8 bu. per acre, was made by Piasa

VARIETY OF CORN; SOURCE OF SEED; GERMINATION; STAND; BARREN STALKS; HEIGHT OF STALKS, OF EARS; SIZE OF EARS, OF COBS, 1892.

Plat.	Name of variety.	Source of seed received.		Date of ripening.	Percentage of barren stalks.	Percentage of full stand of stalks.	Percentage germinating in field.	Percentage g'm'g in Geneva apparatus.	Height, ft.	Ears.		Av. of 3 specimen ears.
										Stalks.	Length, in.	
1	Murdock.....	Wm. T. Lamb.....	Ridott, Ill.....	Sep. 10	8	81	90	98	7.7	4.1	7.7	Circumference cob, in. 3.9
2	Ensilage corn.....	I. N. Shannon.....	Goodlettsville, Tenn.....	Oct. 11	16	74	93	96	10.4	5.6	8.2	Circumference ear, in. 6.2
3	[Yellow variety, no name]		Lincoln, Ill.....	Sep. 21	5	84	95	100	9	5.1	9.2	6.8
4	Leaming.....	T. Chester.....	Champaign.....	" 21	18	93	92	92	7.3	3.8	8.2	4.6
5	".....	".....	".....	" 21	18	83	92	92	8.4	4.1	8.5	4.3
6	Giant beauty.....	Johnson & Stokes.....	Philadelphia.....	" 29	10	55	62	90	7.9	3.7	8.4	4.7
7	Golden beauty.....	W. W. Barnard & Co.....	Chicago.....	" 21	4	66	66	96	9.6	4.9	8.9	4
8	Golden beauty.....	Wm. H. Maule.....	Philadelphia.....	" 29	17	74	74	76	9.7	5.4	9.2	3.9
9	Pride of Kansas.....	Samuel Wilson.....	Mechanicsville, Pa.....	" 29	9	83	83	98	8.4	4.2	9	4.3
10	".....	".....	".....	" 29	12	84	84	98	8.5	4.1	8.7	4.2
11	Farmers' favorite.....	Wm. H. Maule.....	Philadelphia.....	Oct. 11	9	77	98	72	9.8	5.2	9.2	4.2
12	Piasa queen.....	E. P. Kellenberger.....	Godfrey, Ill.....	" 4 10.1	3	97	100	97	10.1	5.7	9.7	4.2
13	Piasa king.....	".....	".....	" 4	12	91	90	95	10.2	5.5	8.6	4.2
14	Ivory dent.....	R. H. Vanderhoof.....	Newton, Ill.....	Sep 29	15	91	98	98	9	5.4	8	4.2
15	".....	".....	".....	" 29	10	89	90	98	9.2	5	7.9	4
16	B. O. E. ensilage.....	J. H. Beagley.....	Sibley, Ill.....	" 21	7	85	85	85	8.3	3.5	7.9	4
17	Farmers' favorite golden.....	Peter Henderson & Co.....	New York.....	Oct. 11	2	73	70	73	11.1	5.8	9.4	4.2
18	Helms improved.....	Fred Helms.....	Belleville, Ill.....	" 11 10	8	88	100	95	10	5.4	9.2	3.7
19	White surprise.....	Henry A. Dreer.....	Philadelphia.....	" 11 10.5	13	83	94	72	10.5	6.1	9.1	5.2
20	".....	".....	".....	" 11	18	77	75	94	9.7	5.5	9	4.9
21	Clark's 110-day.....	H. H. Clark.....	Onarga, Ill.....	Sep 29	4	86	100	100	8.1	3.5	8	3.8
22	Burr's white.....	University farm.....	Champaign.....	" 29	1	83	86	90	8.4	3.7	8.5	3.7
23	Fisk's white.....	E. C. Fisk.....	Havana, Ill.....	Oct. 4	6	79	98	98	9.9	4.9	8.5	3.7
24	Murdock.....	Wm. T. Lamb.....	Ridott, Ill.....	Sep. 10	11	90	98	98	7.5	3	7.6	3.5
25	".....	".....	".....	" 10	7	86	90	98	7.8	3	7.9	3.4
26	Leaming.....	T. Chester.....	Champaign.....	" 29 10.5	11	82	89	92	10.5	4.7	8.8	4
27	Boone county white.....	James Riley.....	Thorntown, Ind.....	" 29 10.1	12	90	95	92	10.1	5.3	8.1	4.1

28	Champion white pearl.	Currie Bros.	Milwaukee.	98	86	79	9	"	29	8.7	4.1	8.5	6.7	4.1
29	Baker's white.	G. W. L. Baker.	Payson, Ill.	94	93	91	12	"	10	8.2	3.2	8.5	5.8	3.2
30	"	"	"	94	90	85	4	"	10	8.1	3.9	8.2	5.9	3.4
31	White variety, no name.	J. W. Babb.	Ashland, Ill.	100	86	81	6	"	29	11.2	6.5	10.4	6.7	4.2
32	Yellow variety, no name.	J. P. Shearer.	Cullom, Ill.	98	93	92	8	"	10	8.6	4.6	7.4	6.3	3.4
33	White prolific	Samuel Wilson.	Mechanicsville, Pa.	94	89	87	8	"	21	7.7	3.7	7.9	6.2	3.7
34	Bickerdike's early mammoth.	James Bickerdike.	Grigsville, Ill.	98	95	94	8	"	29	9.5	4.7	8	7	4.4
35	"	"	"	98	98	100	10	"	29	9.1	4.5	8.7	6.9	4.3
36	Farmers' interest.	Geo. T. Leatherman.	Burlington, W. Va.	100	97	97	3	"	21	8.7	4.1	7.2	5.9	3.3
37	Fisk's yellow.	E. C. Fisk.	Havana, Ill.	98	93	89	6	"	21	7.7	3.2	8.2	6.7	3.7
38	Baker's yellow.	G. W. L. Baker.	Payson, Ill.	100	92	92	7	"	29	8.9	5.2	7.9	6.5	3.4
39	Eclipse.	E. P. Kellenberger.	Godfrey, Ill.	98	88	91	8	"	21	10.4	4.6	8	6.7	3.9
40	"	"	"	98	91	84	18	"	21	8.2	4.2	8.5	6.8	3.9
41	Early mastodon.	Currie Bros.	Milwaukee.	74	60	55	8	"	21	8.3	3.7	9.3	7.2	4.5
42	Leaming.	E. P. Kellenberger.	Godfrey, Ill.	100	98	....	....	"	21	8.3	3.7	7.8	6.2	3.7
43	Improved Leaming.	John McCabe.	Hammond, Ill.	100	91	90	20	"	29	8.6	4.6	8.4	6.4	3.8
44	Sterling.	J. T. Groves.	Pana, Ill.	96	91	90	8	"	21	9.1	4.6	8.3	6.7	3.8
45	"	"	"	96	92	90	19	"	21	8.2	4.4	8.6	6.7	3.8
46	Leeper.	J. A. Leeper.	Farmington, Ill.	100	96	84	11	"	29	10.2	5	9.1	7.2	4.1
47	Yellow variety, no name.	E. B. Watson.	Waverly, Ill.	100	98	95	8	"	29	9.1	4.6	8.4	6.6	3.8
48	"	S. P. Campbell.	Loami, Ill.	98	97	94	9	"	29	9	5.1	11	6	4.7
49	Clark's Iroquois.	H. H. Clark.	Onarga, Ill.	100	89	88	8	"	21	9	4.7	8.2	6.8	3.7
50	"	"	"	100	89	86	12	"	21	8.3	4.1	8.1	6.8	3.7
51	Yellow variety, no name.	J. W. Babb.	Ashland, Ill.	98	96	91	20	"	29	9.5	4.4	9.2	6.5	4
52	Improved Leaming.	Currie Bros.	Milwaukee.	96	85	82	5	"	21	9.4	5.3	8.4	6.8	4.1
53	Woodhull.	Samuel Wilson.	Mechanicsville, Pa.	86	86	82	14	"	29	8.6	3.7	10.9	6.6	4.4
54	Pride of Columbia.	J. H. Beagley.	Sibley, Ill.	....	93	88	9	"	10	7.9	3.6	8.1	6.1	3.2
55	"	"	"	....	94	92	12	"	10	8.2	4.5	8.1	6.1	3.1
56	Burr Oaks Leaming.	"	"	....	89	92	8	"	21	9.2	4.2	8.2	6.9	4.2
57	Log cabin.	C. N. Butt.	Knoxville, Ill.	98	93	90	12	"	29	8.2	3.5	8.7	7	4.3
58	Chester county mammoth.	J. C. Vaughan.	Chicago.	90	77	75	15	"	21	8.5	4	7.7	7.4	4.2
59	California yellow.	"	"	94	86	98	12	"	29	8.8	4.6	8.2	6.8	3.7
60	"	"	"	94	83	81	9	"	29	7.6	3.7	8.2	6.7	3.7
61	Hughes.	Agricultural Experiment Station.	Columbus, Ohio.	88	87	87	5	"	29	10.8	5.7	8.7	7	4.1
62	Thomas.	"	Lincoln, Neb.	86	89	89	7	"	10	8.2	4	8.6	6.7	4.2
63	Improved Leaming.	S. S. Dunseth.	Forrest, Ill.	96	93	89	9	"	21	7.9	3.7	7.8	6.3	3.6
64	Clark's Onarga.	H. H. Clark.	Onarga, Ill.	96	95	96	8	"	29	8.7	4.4	8.3	6.2	3.7
65	"	"	"	96	92	84	11	"	29	9.2	4.5	8.4	6.5	3.5
66	Murdock.	Wm. T. Lamb.	Kidott, Ill.	98	90	87	8	"	10	9.1	4.7	7.9	6.2	3.6

VARIETY OF CORN; SOURCE OF SEED; GERMINATION; STAND; BARREN STALKS; HEIGHT OF STALKS, OF EARS; SIZE OF EARS, OF COBS, 1892.

Plat.	Name of variety.	Source of seed received.	Percentage of Geneva apparatus.	Percentage germin- ating in field.	Percentage of full stand of stalks.	Percentage of bar- ren stalks.	Date of Ripening.	Height, ft.		Av. of 3 speci- men ears.		
								Stalks.	Ears.	Length, in.	Circumfer- ence ear, in.	Circumfer- ence cob, in.
67	[Yellow variety, no name]	Rufus K. Day.....	92	93	89	9	" 29	8.7	4.4	8.2	7.7	4.8
68	Leaming.....	University farm.....	90	88	86	13	" 21	9.3	4.4	8.6	6.4	3.8
69	".....	T. Chester.....	92	85	87	5	" 29	7.3	4.1	8.8	6.8	4.3
70	".....	".....	92	93	94	8	" 29	8.3	3.7	8.6	6.9	4.2
71	Steward's improved.....	L. W. Steward.....	100	96	92	6	" 29 ¹⁰	5.5	5.5	7.7	6.6	3.7
72	Second premium.....	R. Q. Duncan.....	90	86	85	1	" 29	8.7	4.5	8.4	6.7	3.7
73	Geo. Prentice corn.....	Geo. Prentice.....	100	73	62	9	" 29	8.4	3.8	8.8	7.2	4.2
74	Branson's climax.....	W. T. Branson.....	98	95	95	1	" 29	9.1	4.2	8.3	6.7	4.1
75	".....	".....	98	81	95	6	" 29	8.8	4.4	7.6	6.7	3.9
76	Legal tender.....	Nims Bros.....	100	87	81	4	" 29	9.8	4.6	8.7	6.7	3.8
77	[Yellow variety, no name]	James Riley.....	....	87	89	2	" 21	9.2	4.4	8	7	3.9
78	Riley's favorite.....	".....	100	89	90	7	" 29	8.3	4.1	9	6.9	4.1
79	[Yellow variety, no name]	W. C. Gibbs.....	98	96	91	12	" 29	9.2	4.3	8.6	7.1	4.2
80	".....	".....	98	91	92	23	" 29	9.8	5.6	8.2	7.2	4.2
81	Calico.....	S. M. Cox.....	82	72	66	13	" 21	9.1	3.8	7.7	6.7	4
82	Cranberry.....	J. C. Vaughan.....	100	87	83	13	" 29	8.4	4.4	7.7	6.6	3.7
83	Hickory king.....	Samuel Wilson.....	....	54	59	9	Oct 11	10.4	5	7.6	5.7	2.5
84	Clarage.....	Agricultural Experiment Station.....	92	95	98	9	Sep 21	8.7	4	8.1	6.4	4
85	".....	".....	92	94	87	11	" 21	8.2	3.6	7.9	6.2	3.7
86	Callaway's white.....	S. H. Callaway.....	98	95	87	7	" 15	8.7	3.8	6.8	6.2	3.8
87	Ohio white dent.....	M. H. Smith & Son.....	80	74	69	7	" 21	9.1	4.2	8.9	7.1	4.1
88	Hess white.....	Agricultural Experiment Station.....	92	81	82	3	" 21	8.7	4.4	8.9	6.4	4
89	Blue River.....	J. Percival.....	100	91	88	11	" 29	8.9	4.2	8.9	6.9	4.7
90	".....	".....	100	90	84	13	" 29	8.4	4	8.2	6.7	4.1
91	Champion white pearl.....	E. P. Kellenberger.....	100	95	91	6	" 29	9.1	4.4	8.2	6.3	3.8
92	[White variety, no name]	Wm. Sieck, Jr.....	....	95	92	9	" 21	9.7	4.2	8.3	6	3.6
93	Kansas branching.....	W. E. Lodge.....	96	83	79	6	" 29	9.7	4.8	9.3	5.4	3.4

94	Early Wisconsin.....	Currie Bros.....	Milwaukee.....	94	86	75	8	"	10	7-9	3	8-2	6-3	3-7
95	".....	".....	".....	94	86	73	12	"	10	7-2	2-6	8	6-2	3-9
96	Minnesota king.....	Samuel Wilson.....	Mechanicsville, Pa.....	98	90	81	7	"	10	7-6	3-4	7-1	4-9	2-9
97	Early white dawn.....	A. W. Livingston's Sons.....	Columbus, Ohio.....	98	86	84	11	"	21	8-3	4-2	8-3	6-5	3-8
98	Beard's pearl.....	".....	".....	100	85	74	4	"	29	8-7	4	7-7	6-7	4-1
99	Clarke county champion.....	J. M. McCullough's Sons.....	Cincinnati.....	100	90	83	6	"	21	8-8	3-2	8-6	5-7	3-3
100	".....	".....	".....	100	86	89	7	"	21	8-1	3-6	8-2	6	3-6
101	Haber's early.....	K. B. Morehouse.....	Urbana, Ill.....	100	95	87	8	"	10	8-4	3-3	7	6	3-5
102	Pusey's cross bred.....	W. W. Pusey.....	Odell, Ill.....	.....	92	81	20	"	5	7-9	2-6	9-5	5-8	3-7
103	Murdock.....	University farm.....	Champaign.....	96	84	85	5	"	15	8-6	4-6	8	5-7	3-6
104	Dunlap's white.....	H. M. Dunlap.....	Savoy, Ill.....	100	97	95	5	"	21	9-5	4-7	8-2	6-4	3-8
105	".....	".....	".....	100	95	94	8	"	21	7-7	3-4	7-4	6-4	3-7
106	Queen of the field.....	J. C. Vaughan.....	Chicago.....	100	93	71	6	"	21	8-2	3-8	7-2	5-9	3-2
107	Leaming.....	T. Chester.....	Champaign.....	92	94	7	7	"	29	9-7	4-3	9-1	6-7	4-3
108	Murdock.....	Wm. T. Lamb.....	Ridott, Ill.....	98	86	85	9	"	10	8-7	3-8	7-8	6-2	3-7
109	Edmonds.....	J. C. Vaughan.....	Chicago.....	92	81	4	4	"	21	8-3	3-6	7-4	6-2	3-4
110	".....	".....	".....	92	77	76	7	"	21	7-7	3-3	7-6	6-4	3-6
111	Early Butler.....	Currier Bros.....	Milwaukee.....	98	93	81	7	"	10	8-2	3-4	6-6	5-7	3-3
112	Munns.....	Jas. Riley.....	Thorntown, Ind.....	100	93	86	4	"	21	10-1	4-8	8-2	6-4	4-1
113	90-day yellow.....	J. W. Babb.....	Ashland, Ill.....	96	96	89	5	"	21	8-2	4-3	7-7	7-5	4-2
114	Pride of the north.....	J. C. Vaughan.....	Chicago.....	96	94	100	13	"	10	7-8	2-9	7-5	5-5	3-2
115	".....	".....	".....	96	93	86	6	"	10	7-2	3-1	7-6	6-2	3-3
116	[Yellow variety, no name].....	E. P. Kellenberger.....	Godfrey, Ill.....	100	98	84	3	"	10	7-2	3	7-1	5-7	3-2
117	Burr's white-cranberry cross.....	Station, 1890.....	".....	.....	59	56	5	"	29	9-1	4-6	8-7	7-2	3-9
118	Burr's white-helms imp. cross.....	".....	".....	.....	92	91	7	"	29	8-7	3-9	9-4	6-5	4
119	Cloud's early.....	Henry A. Dreer.....	Philadelphia.....	72	62	57	15	"	29	8-1	3-7	8-5	5-9	3-4
120	".....	".....	".....	72	69	61	12	"	29	8	4-2	8-9	7-3	4-6
121	Mixture, <i>a</i>.....	".....	".....	.....	90	81	7	"	29	9-1	4-5	.....	.....	.....
122	Mixture, <i>b</i>.....	".....	".....	.....	87	83	7	"	10	8-6	3-8	7-9	6-4	3-7
123	Leaming-golden beauty cross.....	Station, 1890.....	".....	.....	92	100	4	"	29	9-3	4-8	.....	.....	.....
124	Champion wh pearl-leaming cross.....	".....	".....	.....	69	75	11	"	21	8-5	4-2	.....	.....	.....
125	Burr's white-Edmonds cross.....	".....	".....	.....	92	94	8	"	21	9-6	5-6	8-2	6-4	3-7
126	Mixture, <i>c</i>.....	".....	".....	.....	88	85	5	"	29	9-2	4-6	8-4	6-6	3-9
127	Mixture, <i>d</i>.....	".....	".....	.....	89	73	12	"	29	9-9	4-8	8-6	6-8	4-2
128	Mixture, <i>e</i>.....	".....	".....	.....	99	86	19	"	29	10-8	5-7	9-7	7-3	4-2
129	Golden dew drop.....	Peter Henderson & Co.....	Philadelphia.....	96	97	.....	.....	"	5	5-8	1-7	7-7	4-3	2-6
130	Longfellow.....	Henry A. Dreer.....	Philadelphia.....	84	84	.....	.....	"	5	5-2	2-2	8	4-3	2-7

VARIETY TESTS, YIELD, 1892.

Plat.	Name of variety.	Per cent water in shelled corn when husked.	Lb. ear corn per acre when husked.	Lb. ear corn per bu. when shelled.	Lb. when husked to make bu. air-dry.	Bu. shelled corn per acre		
						Total as shelled.	Total air dry.	Loss in drying.
1	Murdock.....	22.2	4012	69.1	79	58.1	50.8	7.3
2	Ensilage corn	32.9	5750	71.8	95.2	80.1	60.4	19.7
3	[Yellow variety, no name].....	20.6	5720	69.8	78.2	81.9	73.1	8.8
4	Leaming.....	17.5	3973	67.8	73.2	58.6	54.3	4.3
5	".....	19.5	4440	66.3	73.4	66.9	60.5	6.4
6	Giant beauty.....	22.5	4280	69.5	79.8	61.6	53.7	8
7	Golden beauty.....	21.6	4740	68.4	77.7	69.3	61	8.3
8	Golden beauty.....	25.2	5380	69.5	82.6	77.4	65.1	12.3
9	Pride of Kansas.....	22.5	5130	69.9	80.3	73.4	63.9	9.5
10	".....	24.5	5240	70.1	82.6	74.7	63.4	11.3
11	Farmers' favorite.....	30.1	5860	70.5	89.7	83.1	65.3	17.8
12	Piasa queen.....	27.5	8490	69.3	85.1	122.5	99.8	22.7
13	Piasa king.....	24.6	6540	69.5	82.1	94.1	79.7	14.4
14	Ivory dent.....	20.2	5530	67.9	75.8	81.4	72.9	8.5
15	".....	19.9	6070	67.5	75	89.9	80.9	9
16	B. O. E. ensilage	26.6	5380	72.6	79.4	74.7	67.8	6.3
17	Farmers' favorite golden	29.4	6640	75.5	95.3	87.9	69.7	18.2
18	Helm's improved	28.4	6860	69.7	86.6	98.4	79.2	19.2
19	White surprise.....	34.4	6460	76.5	103.8	84.4	62.2	22.2
20	".....	36.6	6700	79.1	111.1	84.7	60.3	24.4
21	Clark's 110-day.....	23.2	4790	67.8	78.6	70.6	60.9	9.7
22	Burr's white.....	21.3	4900	67.5	76.3	72.6	64.2	8.4
23	Fisk's white.....	21.1	5690	70	82.2	81.2	69.2	12
24	Murdock.....	19.3	3690	68.1	75.2	54.2	49.1	5.1
25	".....	18.9	4144	68.6	75.4	60.4	55	5.4
26	Leaming.....	18.6	4510	67.7	73.1	67.5	61.7	5.8
27	Boone county white.....	17.7	6310	68.2	73.8	92.5	85.5	7
28	Champion white pearl.....	16.5	4710	67.8	72.5	69.3	65	4.3
29	Baker's white.....	17.9	3610	64.4	69.8	56.5	52.1	4.4
30	".....	18.7	4040	64.1	69.9	63	57.8	5.2
31	[White variety, no name].....	23.7	6760	70.9	82.7	95.3	81.7	13.6
32	".....	23	3920	68.2	79	57.4	49.6	7.8
33	White prolific.....	16.6	4710	68	72.5	69.3	64.9	4.4
34	Bickerdike's early mammoth.....	19.8	5310	70.3	78.1	75.5	68	7.5
35	".....	23.7	6040	73.3	85.5	82.4	70.6	11.8
36	Farmers' interest	27	5320	66.3	80.8	80.2	65.8	14.4
37	Fisk's yellow.....	18.4	4380	66.8	72.9	65.6	60.1	5.5
38	Baker's yellow.....	19.6	4610	65.1	72.1	70.8	63.9	6.9
39	Eclipse.....	23.1	4720	68.5	79.3	68.9	59.5	9.4
40	".....	25	4970	68.4	81	72.6	61.2	11.4
41	Early mastodon.....	23.8	4160	71.7	83.9	58	49.6	8.4
42	Leaming.....	25.7	5940	68.5	82	86.7	72.4	4.3
43	Improved Leaming.....	20.2	4668	69.3	77.3	67.4	60.4	7
44	Sterling.....	17.6	4860	68.3	73.8	71.1	65.8	5.3
45	".....	17.3	5200	68.8	74.1	75.6	70.2	5.4
46	Leeper.....	19.9	4100	69.4	77.1	63.4	57.1	6.3
47	[Yellow variety, no name].....	19.6	4830	66.6	73.9	72.3	65.3	7
48	".....	18.7	5940	69.7	76.3	85.2	77.8	7.4
49	Clark's Iroquois.....	15.6	4820	65.1	68.6	74	70.2	3.8
50	".....	15.8	5070	65.8	69.5	77.1	72.9	4.2
51	[Yellow variety, no name].....	22.7	5060	67	77.1	75.5	65.6	9.9
52	Improved Leaming	16.5	4560	68.2	72.7	66.8	62.7	4.1
53	Woodhull.....	17.1	5770	67.6	76.9	72.2	67.2	5
54	Pride of Columbia.....	19.1	3660	64.6	71.2	56.6	51.4	5.2
55	".....	18.7	4150	64.8	70.9	64	58.5	5.5
56	Burr Oaks Leaming	22.5	5110	70.2	80.6	72.8	63.4	9.4
57	Log cabin.....	17.8	5390	69.3	75.1	77.8	71.8	6
58	Chester county mammoth.....	18.2	5020	67.3	73.2	74.6	68.6	6
59	California yellow	16.8	4970	66.1	70.8	75.2	70.3	4.9
60	".....	18.4	5540	66.9	72.9	82.8	75.9	6.9
61	Hughes.....	22.3	6530	71.3	81.7	91.6	79.9	11.7
62	Thomas.....	21.3	4940	69.2	78.3	71.3	63.1	8.2
63	Improved Leaming.....	15.9	5160	65.8	69.6	78.4	74.1	4.3
64	Clark's Onarga.....	18.1	5010	65	70.7	77.1	70.9	6.2
65	".....	20	5680	66	73.4	86.1	77.4	8.7
66	Murdock.....	23.1	4800	67	77.7	71.6	61.8	9.8
67	[Yellow variety, no name]	19.1	6240	69.4	76.4	89.9	81.7	8.2
68	Leaming.....	16.4	5350	68.2	72.7	78.4	73.6	4.8
69	".....	18.4	5610	68.9	75.2	81.4	74.6	6.8
70	".....	19	5990	69.1	76	86.6	78.8	7.8
71	Steward's improved	22.8	5810	67.7	78.1	85.8	74.4	11.4
72	Second premium.....	17.6	5850	64.6	69.8	90.5	83.8	6.7
73	Geo. Prentice corn	21.9	4750	69.8	79.6	68.1	59.7	8.4

VARIETY TESTS, YIELD, 1892—Continued.

Plat.	Name of variety.	Per cent water in shelled corn when husked.	Lb. ear corn per acre when husked.	Lb. ear corn per bu. when shelled.	Lb. when husked to make bu. air-dry.	Bu. shelled corn per acre		
						Total as shelled.	Total air-dry.	Loss in drying.
74	Branson's climax.....	17.5	5490	66.6	71.9	82.4	76.4	6
75	".....	20.8	5820	66.8	75.1	87.1	77.5	9.6
76	Legal tender.....	21.8	4630	67.5	76.8	68.6	60.3	8.3
77	[Yellow variety, no name].....	18	5760	68.7	74.6	83.8	77.2	6.6
78	Riley's favorite.....	17.5	5340	66.8	72.1	79.9	74.1	5.8
79	[Yellow variety, no name].....	21.2	4470	68.1	75.5	65.6	59.2	6.4
80	".....	22.5	5870	68.1	78.2	86.2	75.1	11.1
81	Calico.....	19.6	3690	69.2	76.7	53.3	48.1	5.2
82	Cranberry.....	26.7	5020	67.1	81.5	74.8	61.6	13.2
83	Hickory king.....	30.1	3920	64.1	81.8	61.1	47.9	13.2
84	Clarage.....	18.7	4350	66.7	73.1	65.2	59.5	5.7
85	".....	18.5	4640	66.6	72.8	69.6	63.7	5.9
86	Callaway's white.....	24.9	4700	73.4	87	64	54	10
87	Ohio white dent.....	21.4	5110	69.2	78.4	73.8	65.2	8.6
88	Hess white.....	19.2	5560	67.8	74.7	82	74.4	7.6
89	Blue River.....	19.8	5470	73.2	81.3	74.7	67.3	7.4
90	".....	19.8	5480	71.6	79.5	76.5	68.9	7.6
91	Champion white pearl.....	19.4	4570	68.3	75.4	66.9	60.6	6.3
92	[White variety, no name].....	20.2	5750	67.1	74.8	85.7	76.8	8.9
93	Kansas branching.....	22	6060	71.8	81.9	84.4	74	10.4
94	Early Wisconsin.....	19.6	3960	69.2	76.7	57.2	51.6	5.6
95	".....	22.2	2740	69.5	79.6	39.4	34.4	5
96	Minnesota king.....	21.8	2920	71.5	81.3	40.8	35.9	4.9
97	Early white dawn.....	21.9	5070	68.6	78.2	73.9	64.8	9.1
98	Beard's pearl.....	17.2	4020	68.1	73.2	59	54.9	4.1
99	Clarke county champion.....	20.9	4250	68.4	76.7	62.3	55.4	6.9
100	".....	20.3	4860	67.6	75.5	71.9	64.4	7.5
101	Haber's early.....	25.7	3880	67.6	81	57.4	47.9	9.5
102	Pusey's cross-bred.....	22.2	3050	71.3	81.8	42.7	37.3	5.4
103	Murdock.....	20.2	5050	68.2	76.1	74.1	66.4	7.7
104	Dunlap's white.....	25.9	6020	68.6	83.8	87.6	71.8	15.8
105	".....	22.8	6600	67.1	77.4	98.3	85.2	13.1
106	Queen of the field.....	22.2	3390	70.3	80.5	48.2	42.1	6.1
107	Leaming.....	20.1	6150	69.5	77.5	88.5	79.4	9.1
108	Murdock.....	21	4770	67.4	76.1	70.7	62.7	8
109	Edmonds.....	23.7	4470	67.6	78.9	66.1	56.7	9.4
110	".....	23.4	4530	66.7	77.6	67.9	58.4	9.5
111	Early Butler.....	22.9	3590	68.7	79.4	52.2	45.2	7
112	Munns.....	19.2	5650	68.9	75.9	82	74.4	7.6
113	90-day.....	19.1	4640	67.6	74.5	68.6	62.3	6.3
114	Pride of the north.....	17.8	3440	65.1	70.6	52.8	48.7	4.1
115	".....	16.9	3720	64.1	68.6	58	54.2	3.8
116	[Yellow variety, no name].....	24.1	3740	67.8	79.4	55.2	47.1	8.1
117	Burr's white-cranberry cross.....	24.3	5060	67.1	78.9	75.4	64.1	11.3
118	Burr's white-Helms imp. cross.....	26.2	6260	71	85.6	88.2	73.1	15.1
119	Cloud's early.....	24	4190	69.7	81.7	60.1	51.3	8.8
120	".....	24.9	5890	69.9	82.8	84.3	71.1	13.2
121	Mixture <i>a</i>	22.4	5500	68.2	78.2	80.6	70.3	10.3
122	Mixture <i>b</i>	17.1	4200	66.1	71.1	63.5	59.1	4.4
123	Leaming-Golden beauty cross.....	21.9	6660	67.7	77.3	98.3	86.2	12.1
124	Champion wh. pearl-Leaming cross.....	17.6	5770	70.1	75.7	82.3	76.2	6.1
125	Burr's white-Edmonds cross.....	20.3	5990	68.3	76.3	87.7	78.5	9.2
126	Mixture <i>c</i>	21.5	4900	64.3	72.9	76.2	67.2	9
127	Mixture <i>d</i>	23.8	4900	67.5	78.9	72.6	62.1	10.5
128	Mixture <i>e</i>	24.4	7070	78.9	92.9	89.6	76.1	13.5
129	Golden dew drop.....	15	1100	68.9	78	15.9	14.1	1.8
130	Longfellow.....	14	670	68.4	71.2	9.8	9.4	.4

queen, a yellow, late maturing variety, seed obtained from E. P. Kellenberger, Godfrey, Ill. It is rather too late for this locality.

The following table gives the yield for each of eight varieties for six years, and of eleven for five years, arranged in the order of the average yields. Of these varieties, Champion white pearl, Burr's white, and Helms improved are white; the others are yellow. Murdock and Edmonds are early maturing, Helms improved late, and the others medium. The average yield of the eleven varieties for five years is 69.3 bu. per acre. Other varieties of considerable merit, that have been tested for two or more years, are Dunlap's white, Clark's Onarga, California yellow, and ivory dent.

YIELD OF AIR-DRY CORN OF VARIETIES TESTED FOR YEARS NAMED.

Eight varieties tested in	1887.	1888.	1889.	1890.	1891.	1892.	Av.
Leaming.....	29.6	86.6	80.6	69.4	67.3	70.1	67.3
Champion white pearl.....	20.2	70	94.8	74.9	76.5	65	66.9
Burr's white.....	30	85.9	75.7	67.7	67.7	64.2	65.2
Steward's improved yellow.....	32.4	91.2	68.7	54.7	58.4	74.4	63.3
Riley's favorite.....	30.8	81.8	66.1	53.3	56.1	74.1	60.4
Murdock.....	33.3	80.3	65	61.6	59.8	57.6	59.6
Legal tender.....	25.8	84.2	68.9	60	56.8	60.3	59.3
Edmonds.....	27.7	83.7	66.3	55.9	58.6	58.4	58.4

Eleven varieties tested in	1888.	1889.	1890.	1891.	1892.	Av.
Champion white pearl.....	70	94.8	74.9	76.5	65	76.2
Leaming.....	86.6	80.6	69.4	67.3	70.1	74.8
Burr's white.....	85.9	75.7	67.7	67.7	64.2	72.2
Helms improved.....	84.8	102.6	51.1	39	79.2	71.3
Clark's Iroquois.....	68.5	81.9	59	65.4	72.9	69.5
Steward's improved yellow.....	91.2	68.7	54.7	58.4	74.4	69.5
Riley's favorite.....	83.7	66.3	55.9	58.6	74.1	67.7
Fisk's yellow.....	76.6	79.5	61.7	57.4	60.1	67.1
Legal tender.....	84.2	68.7	60	56.8	60.3	66
Murdock.....	80.3	65	61.6	59.8	57.6	64.9
Edmonds.....	81.1	66.1	53.3	56.1	58.4	63

A comparison of the white and yellow varieties for 1892 shows an average yield of 66.3 bu. per acre for the white and 66.2 bu. for the yellow.

Experiment No. 3. Corn, Time of Planting.

Experiments to test the effect of time of planting on yield have been conducted for the past five years. The ground used in 1892 was plowed about six inches deep in April, just after having been manured with barnyard manure at the rate of about thirty loads per acre. The plats, sixteen in number, were each two rods, or nine hills square, and were planted by hand, four kernels per hill, 3 ft. 8 in. apart each way. The first two plats were planted April 30th, and two plats were planted each week thereafter till June 20th. Two varieties of corn, Murdock (early yellow) and Burr's white (medium white), were used

in each planting. One-half of the tract on which the Murdock was planted was in corn in 1891 and the remainder in oats. All the plats were cultivated three times and the weeds remaining were removed with a hoe. After the corn was well up and before the first cultivation, the number of plants on each plat was ascertained. Beginning with June 13th each stalk of one row running across each plat was measured each week during its growth. The average height in inches to the tip of tassel and upstretched leaf for each plat is given in the table for every week.

AVERAGE HEIGHTS TAKEN WEEKLY IN INCHES TO TIP OF TASSEL AND LEAF, 1892.

Plat.		June 13	June 21	June 29	July 4	July 12	July 19	July 26	Aug 2	Aug 9	Aug 17	Aug 23	Sept 6	Sept 21
1	{ Tassel..	....	....	....	....	....	85	95	96	95	93	93	95	....
	{ Leaf....	19	32	47	52	72	89	95	95	94	93	93	89	....
2	{ Tassel..	....	....	....	....	....	77	101	109	111	108	110	108	....
	{ Leaf....	19	32	48	54	73	86	101	108	107	105	106	103	....
3	{ Tassel..	....	....	....	....	....	77	99	98	98	98	98	97	....
	{ Leaf....	16	29	44	49	69	87	94	96	96	95	94	93	....
4	{ Tassel..	....	....	....	....	....	....	97	110	111	109	110	109	....
	{ Leaf....	14	28	40	51	63	75	93	108	110	110	108	106	....
5	{ Tassel..	....	....	....	....	....	70	92	97	96	96	96	96	....
	{ Leaf....	13	24	38	44	61	79	91	93	90	91	90	89	....
6	{ Tassel..	....	....	....	....	....	....	89	97	98	98	100	99	....
	{ Leaf....	12	20	33	37	55	72	90	98	100	99	99	99	....
7	{ Tassel..	....	....	....	....	....	58	86	91	91	91	90	90	....
	{ Leaf....	12	23	37	42	59	72	85	88	88	87	87	88	....
8	{ Tassel..	....	....	....	....	....	....	87	100	104	103	105	103	....
	{ Leaf....	11	23	3	42	57	74	93	96	104	102	104	102	....
9	{ Tassel..	....	....	....	....	....	....	66	80	87	87	88	87	....
	{ Leaf....	6	15	24	29	43	58	73	83	86	86	84	86	....
10	{ Tassel..	....	....	....	....	....	....	....	79	82	97	98	101	98
	{ Leaf....	7	15	23	28	41	54	70	85	93	94	96	98	98
11	{ Tassel..	....	....	....	....	....	....	64	69	86	91	90	88	....
	{ Leaf....	....	....	19	23	36	50	68	78	88	89	89	89	....
12	{ Tassel..	....	....	....	....	....	....	....	88	96	102	103	101	100
	{ Leaf....	....	....	21	27	40	56	76	88	99	103	104	102	99
13	{ Tassel..	....	....	....	....	....	....	....	86	84	94	99	101	101
	{ Leaf....	....	....	11	15	24	36	56	69	86	96	98	99	100
14	{ Tassel..	....	....	....	....	....	....	....	....	69	78	94	101	98
	{ Leaf....	....	....	8	11	18	30	47	61	73	87	95	98	98
15	{ Tassel..	....	....	....	....	....	....	....	....	68	78	89	93	99
	{ Leaf....	....	....	....	7	15	26	42	54	67	81	88	90	97
16	{ Tassel..	....	....	....	....	....	....	....	....	....	67	82	86	86
	{ Leaf....	....	....	....	5	7	13	23	33	43	63	76	93	86

The first six plantings of Murdock and the first two of Burr's white were husked Oct. 6th; the remaining ones, Nov. 12th. When husked, the number and pounds of ears were ascertained for each third of each plat. The middle third was shelled, both corn and cobs weighed, and a jar of the shelled corn sent to the laboratory for the determination of water.

In the table it will be seen that there was a fairly good stand on all but the last planting. That so good a stand was procured for the first planting was probably due to the mean temperature, for a few days at

that time, being nearly ten degrees warmer than the mean for the month of May.

The largest yield of air-dry corn, in the case of each variety, was from planting April 30th, the next from May 7th. Taking the average results of five years' trials, however, the largest yield, 66 bu. per acre, is from planting May 11th to 16th, with but one bushel decrease from May 4th to 23d.

Of the latest planting sixty per cent of the Murdock matured, but the Burr's white was all green. Of next to the last planting all the Murdock and twenty-five per cent of the Burr's white matured.

Murdock planted June 1st matured in 101 days, which is less time than any planted either earlier or later required, being 27 days less than that planted April 30th. From the table giving the weekly measurements it will be seen that the first four plantings of Murdock reached nearly their maximum height at the same date, July 26th, and that the first three plantings of Burr's white reached nearly their maximum height at the same date, Aug. 2d. This shows plainly the more rapid growth of corn planted later in the season when the ground is warmer, over that planted early when the ground is cold.

By very early planting, if a good stand is procured and the corn kept equally free from weeds, we may expect as large yields as from later planting. But for this locality the extra labor required to remove weeds and the risk of a poor stand will not justify planting earlier than about May 1st.

RESULTS WITH CORN FROM PLANTINGS AT DIFFERENT DATES, 1892.

Plat No.	Name of variety.	Per cent that came up.	Date of planting.	Date of ripening.	When husked.			Per cent water	Lb. ears when husked to make bu	Lb. ears when husked to make bu. shelled air-dry.	Bu. per acre, air-dry
					No. ears per acre.	Lb. ear corn per acre.	Bu. shelled corn per acre.				
1	Murdock.	85	Apr. 30	Sept. 5	10560	4200	63.6	15.36	66	69.4	60.5
3	"	81	May 7	" 5	9320	4280	63.9	17.27	67	72.5	59.4
5	"	79	May 16	" 10	9240	3840	57.1	16.04	67.2	71.2	53.9
7	"	88	May 23	" 10	10680	3970	58.4	17.48	67.9	73.4	54.1
9	"	79	June 1	" 10	8840	3630	52.7	20.48	68.9	77.1	47.1
11	"	82	June 8	" 21	10000	4650	66.6	24.43	70	82.5	56.5
13	"	81	" 13	" 29	9760	4250	62.1	20.82	68.4	77	55.2
15	"	72	" 20	Oct. 11*	6240	2300	28.7	35.42	80.1	82.8	20.8
2	Burr's white	83	Apr. 30	Sept 10	10480	6590	95.5	22.94	69	79.7	82.7
4	"	74	May 7	" 15	9840	6630	95.1	24.22	69.7	81.9	81
6	"	79	" 16	" 21	10200	6050	78.6	17.3	77	83	73
8	"	85	" 23	" 21	10400	5880	84.8	17.48	69.3	74.8	78.6
10	"	73	June 1	" 29	9360	5280	77.7	18.91	67.9	74.6	70.8
12	"	75	" 8	Oct. 4	9960	6090	89.2	21.4	68.3	77.3	78.8
14	"	71	" 13	" 11†	7560	3950	52.4	27.37	75.4	92.5	42.7
16	"	41	" 20	" 11‡	6240	2300	28.7	35.42	80.1	111	20.8

*60 per cent ripe.

†25 per cent ripe.

‡Green.

RESULTS WITH CORN FROM PLANTINGS AT DIFFERENT DATES, 1888—1892.

Dates.	Bu. air-dry corn per acre.					
	1888.	1889.	1890.	1891.	1892.	Av.
April 22—25 .....	.....	52	.....	51	.....	51.5
April 27—May 2	80	44	67	50	71.6	63
May 4—9	87	51	71	48	72	65
" 11—16	86	56	75	50	70	66
" 19—23	87	50	71	52	63	65
" 26—June 1	83	55	74	34	66	61
June 1—8	81	50	61	37	59	59
June 8—13	50	50	60	19	68	46
" 20 .....	.....	.....	.....	.....	30.5	30.5

Experiment No. 4. Corn, Depth of Planting.

June 2, 1892, fourteen rows, each 4 rods in length, were planted with Burr's white corn, three kernels per hill. The hills were 3 ft. apart in the row, and the rows 3 ft. 8 in. apart. Rows 1 and 8 were planted 1 in. deep, 2 and 9, 2 in. deep, and so on, rows 7 and 14 being 7 inches deep. The land was adjacent to that used for experiment No. 5, and in every way treated the same. The number of hills and plants was greatest for the shallowest planting and least for the deepest. This experiment has been conducted for four years, and from the table it will be seen that the average number of ears per acre uniformly decreases from the shallowest to the deepest planting, and in general the average of bushels per acre also decreases.

RESULTS WITH CORN FROM PLANTINGS AT DIFFERENT DEPTHS.

Depth, in.	Ears per acre.					Bushels per acre.					Ears in a bushel.				
	1888.	1889.	1890.	1892.	Av.	1888.	1889	1890	1892	Av.	1888	1889	1890	1892	Av.
1	11,070	10,530	9,608	8,280	9,872	109.7	83	77.8	65.8	84.1	101	127	124	126	119
2	9,630	10,080	9,385	8,640	9,454	88.4	83	72.8	64.7	77.2	109	121	129	133	123
3	10,440	8,190	9,831	8,910	9,342	100.8	51	70.3	62.7	71.2	104	161	140	142	137
4	9,630	9,540	7,485	9,450	9,026	88	87	58.4	70.3	75.9	109	110	128	135	120
5	8,280	8,820	8,491	7,020	8,153	73.1	81	62.3	56.5	68.2	113	109	136	124	120
6	5,940	10,440	8,389	7,290	8,014	60.3	92	60.3	58.5	67.7	98	113	139	125	118
7	.....	.....	.....	5,130	.....	.....	.....	.....	40.5	.....	.....	.....	.....	127	.....

Experiment No. 5. Corn, Thickness of Planting.

The land used for this experiment was in oats in 1891, and was seeded to clover. It was plowed late in May, after the clover had made considerable growth and after having barnyard manure applied at the rate of about thirty loads per acre. June 4th Burr's white corn was planted by hand in each of 60 rows four rods long, at the varying number of kernels per hill and distances between hills shown in the table.

From the table it will be seen that the proportion of stalks harvested to kernels planted uniformly increases as the thickness of planting

decreases. In general the ratio of ears to stalks increases as the thickness decreases. There seems to be no particular difference as regards the number of kernels per hill. The difference in yield being due to the number of plants on a given area. The weight both of stalks and ears increases as the thickness of planting decreases, except for the thinnest planting, when they are slightly lighter than for the next thicker planting. This would indicate that the maximum growth for each plant can be obtained when there is a goodly number, and that neither the size of ears nor stalks will be increased by having fewer plants than this number.

RESULTS WITH CORN FROM PLANTINGS AT DIFFERENT RATES OF THICKNESS, 1892.

Kernels in a hill.	Inches between hills.	Per acre.					Ratio of stalks harvested to kernels planted.	Av. wt			Ears harvested to 100 stalks.	Bu. per acre, air-dry corn.				
		Kernels planted.	Stalks harvested.	Ears harvested.	Lb. stover.	Lb. ears.		100 stalks.	100 ears.	1888.		1889.	1890.	1892.	Average.	
1	3	47520	23640	19200	9000	8430	.49	38	43	81	73	46.4	24.4	105.3	62.3	
2	6	47520	23460	16980	9060	6735	.49	39	40	72	87.4	46.2	23.2	84.1	60.2	
3	9	47520	23940	16260	9090	6960	.5	38	43	68	81.7	53.5	23.1	87	61.3	
4	12	47520	23880	18840	9870	7815	.5	41	42	79	76.5	45.3	21.2	97.7	60.2	
Av.	....	47520	23730	17820	9255	7760	.495	39	42	75	79.6	47.8	22.9	93.5	61	
1	6	23760	13140	12660	6990	7275	.55	53	57	96	88.5	68.8	39.9	90.9	72	
2	12	23760	14460	12960	8370	7890	.61	58	61	89	87.3	74	41.5	98.6	75.3	
3	18	23760	15420	14340	8160	8265	.65	53	57	93	75.2	70.4	43.9	103.3	73.2	
4	24	23760	14940	13200	8370	8070	.36	56	61	89	81.3	76.4	43.6	100.8	75.5	
Av.	....	23760	14490	13290	7972	7875	.61	55	59	91.7	83	72.4	42.2	98.4	74	
1	9	15840	9900	9540	8940	6975	.62	90	73	96	84.4	78.7	49.8	87.2	75	
2	18	15840	11640	10260	7530	7155	.73	65	69	88	76	81.9	50.2	89.4	74.3	
3	27	15840	10260	9120	7770	6600	.65	75	72	89	75.6	78.8	45.3	82.5	70.5	
4	36	15840	9300	9420	7950	7165	.59	85	76	101	81.7	71.4	45.7	89.5	72	
Av.	....	15840	10275	9585	8047	6973	.647	78.7	75	93.2	79.4	77.7	47.7	87.1	72.9	
1	12	11880	9000	8160	8010	6405	.76	89	78	91	81.7	74.4	60.7	80	74.2	
2	24	11880	9540	7380	9120	6090	.8	95	82	77	79.5	81.5	61.4	76.1	74.6	
3	36	11880	8880	8280	8460	6930	.74	95	83	93	76	77.9	57.1	86.6	74.4	
4	48	11880	9840	8400	9090	6885	.82	92	82	85	70.4	80.6	60.7	86	74.4	
Av.	....	11880	9315	8055	8670	6577	.78	92.7	81	86.5	76.9	78.6	59.9	82.2	74.4	
1	15	9504	8460	7440	8175	6015	.89	97	81	88	71.9	67.2	57.6	75.2	67.9	
2	30	9504	8280	7860	7050	5790	.87	85	73	95	61.7	69.6	54.9	72.3	64.8	
3	45	9504	8220	8220	7155	6030	.86	87	73	100	57.9	72.8	58.9	75.4	66.2	
4	60	9504	7020	7020	5640	5790	.74	80	82	100	....	....	....	72.3	72.3	
Av.	....	9504	7995	7635	7005	5906	.84	87	77	95.7	63.8	69.8	57.1	73.8	67.8	

The yield of stover is greatest for the thickest rate of planting, but the bushels of corn is greater for thinner rates. Taking the average for four years, there seems to be but little difference between planting anywhere from 11,880 to 23,760 kernels per acre. If grown chiefly for the grain, the fewer the ears required to make the maximum yield the less the work in harvesting; but if much value is attached to the stover, the larger amount obtained by planting thicker might more than pay for the extra labor required to harvest the grain. If stover and corn are to be fed together, then it is pretty certainly better to plant thickly. This experiment would indicate that as corn is ordinarily planted there is much less danger of getting too many plants, than of getting too few. One chief reason why smaller yields are obtained from corn planted thickly is probably because many small ears are not husked.

In connection with the above there were planted in hills, on land only a few rods distant which had been cropped and treated the same, eight plats, the kernels per hill and distance apart each way being indicated in the table.

Three plats were planted with Murdock, seed grown at Champaign; three with Murdock, seed obtained from W. T. Lamb, Ridott, Stephenson, Co., in northern Illinois, to whom this variety was sent from the University farms some years ago; and two with Arleus, seed from C. Freeman, Princeton, Ill. Two of the three plats of Murdock from Champaign gave considerably larger yields than the corresponding ones planted with Murdock from northern Illinois.

The largest average yield was from planting five kernels every 3 ft. 8 in. each way, though a greater number of ears was harvested from planting four kernels every 3 ft. in the row and in rows 3 ft. 8 in. apart.

As stated in the report of *Experiment No. 1*, in 21 out of 24 cases larger yields of corn were obtained from plats planted with 4 kernels than from those planted with 3 kernels in each hill, all other conditions being as nearly alike as was possible to secure them.

RESULTS WITH MURDOCK AND ARLEUS PLANTED AT DIFFERENT RATES, 1892.

Plat.	Variety.	Distance between hills ft. and in.	Kernels per hill.	Number per acre.		Wt. of 100 ears in lb.	Yield per acre, bu
				Kernels planted.	Ears harvest- ed.		
1	Murdock, Northern Illinois..	3-8 x 3-8	5	16970	10200	45.1	58.2
2	" Champaign.	" "	5	16970	11320	46.6	66.8
3	" Northern Illinois...	3-8 x 3	4	15840	11960	41.1	64.2
4	" Champaign.....	" "	4	15840	10760	37.	57.3
5	" Northern Illinois...	" "	3	11880	7720	45.8	43.6
6	" Champaign.....	" "	3	11880	9440	47.5	55.9
7	Arleus Princeton.....	" "	3	11880	7760	58.6	53.1
8	" ".....	" "	4	15840	9845	55.7	46.8

Experiment No. 6. Corn, Planting in Hills or Drills.

The land used consisted of five half acre plats. It was plowed in early May and planted May 26th to 28th with Burr's white corn. The corn was dropped by hand and covered with a hoe. The west half of each plat was planted four kernels per hill, 3 ft. 8 in. apart each way, and the east half, one kernel every 11 in. in rows 3 ft. 8 in. apart. The cultivation was the same on both parts, each being cultivated four times and the weeds remaining were removed with a hoe. Sept. 26th to Oct. 1st the corn was cut and shocked. In November the corn was husked and the yield ascertained. In March the stover was weighed. The accompanying table gives the yield per acre for each plat. It will be seen that there is but little difference in the yields of corn, three plats being very slightly in favor of drills and the other two in favor of hills, while the average is less than one bushel in favor of hills. In every instance the yield of stover is slightly in favor of drills, the average being 214 lb. per acre greater.

This experiment, like No. 5, both for this and previous years, seems to indicate that there is practically no difference between hills and drills, so far as yields are concerned.

RESULTS WITH CORN PLANTED IN HILLS AND DRILLS.

Plat No.	Yield per acre. (75 lbs. per bu.).		Yield per acre lb. stover.	
	Hills.	Drills.	Hills.	Drills.
1	58.2	54.7	2520	2700
2	30.3	30.6	1440	1620
3	30.7	31.1	1340	1640
5	61.9	64.4	2600	2840
6	54.8	50.6	2552	2720
Av.	47.2	46.3	2090	2304

Experiment No. 8. Corn, Frequency of Cultivation.

June 3d the tract used for experiments No. 8, 9, and 10 was plowed, harrowed and planted with Burr's white corn, four kernels per hill, hills 3 ft. 8 in. apart each way. It was divided into ten plats. Plats 1 and 5 had the weeds removed without any cultivation and with the least possible disturbance of the soil; 2 and 7 were cultivated shallow, ordinary; 3 and 8 deep, ordinary; 4 and 9 shallow, frequent; and 6 and 10 deep, frequent. The scraping was done with a hoe. The shallow cultivation with the "Superior" cultivator, and a one horse "Planet Junior," the latter being used after the corn was too tall to be cultivated with two horses; and the deep cultivation with a one-horse double shovel. For the dates and frequency of cultivation see table. The number of ears and bushels per acre is given in the table for

RESULTS WITH CORN FROM SHALLOW AND DEEP CULTIVATED PLATS, 1892.

Kind of cultivation.	Yield per acre.		
	No ears.	Bu. corn	Av. bu. for 4 yrs.
None, weeds scraped from surface	9648.9	76.8	78.25
Ordinary, shallow (2 plats).....	8404.9	70.1	78.82
Frequent, shallow "	9820.8	81.5	82
Ordinary, deep "	9839.4	80.1	75
Frequent, deep "	8897.7	69.2	73
Frequent, average (4 plats).....	9359.2	75.3	77.6
Ordinary, " "	9122.1	75.1	76.9
Shallow, average (4 plats).....	9112.8	75.8	80.4
Deep, " "	9368.5	74.6	74

each mode of cultivation. Frequent shallow cultivation increased the yield considerably this year, and gave a slight increase upon taking the average of four years. For deep cultivation the reverse is true. Taking the average of all frequent cultivation against the average of all ordinary cultivation there is practically no difference in yield either for this year or for the average of four years.

CULTIVATION OF PLATS.

Date, 1892.	Plats 1 and 5.	Plats 2 and 7.	Plats 3 and 8.	Plats 4 and 9.	Plats 6 and 10.
June 27.....	Scraped....	Shallow....	Deep	Shallow....	Deep
" 30.....	.....	.....	.....	Shallow....	Deep
July 6 .....	.....	Shallow....	.....	Shallow....	.....
" 7	Scraped....	.....	Deep .....	.....	Deep
" 14 .....	.....	.....	.....	.....	Deep
" 15 .....	.....	.....	.....	Shallow....	.....
" 20 .....	.....	Shallow....	Deep	Shallow....	Deep
" 22	Scraped....	Hoed in row.	Hoed in row.	Hoed in row.	Hoed in row...
Aug. 4.....	.....	.....	.....	Shallow....	Deep

Experiment No. 9—Corn, depth of Cultivation.

For care of crop, see report on *Experiment No. 8* (p. 197). By consulting the table it will be seen that the smallest yield for 1892 was from frequent deep cultivation; while, contrary to former trials, ordinary deep cultivation gave a larger yield than ordinary shallow cultivation. The average of all plats, however, is slightly in favor of shallow cultivation, while the average of four years is in favor of shallow cultivation, both frequent and ordinary. Better yields are obtained by no cultivation, so long as the corn is kept free from weeds, than by deep cultivation. The average of four years shows an increase of 6.4 bu. per acre in favor of shallow cultivation over deep.

Experiment No. 10—Corn, effect of Root-pruning.

Every other row of 18 rows running across the south end of the 10 plats used in *Experiments No. 8 and 9* was root-pruned four inches deep. The pruning was done three times—July 7th, 15th,

and 28th—by placing a frame 12 inches square on the outside, over each hill, and drawing a guaged knife around the edge of it. When husked the number and pounds of ears for each row of each plat were ascertained. The table gives 90 weights, involving 45 comparisons. In 31 of these, the unpruned gave larger yields than the pruned. Taking the total yield of each row running across the ten plats, eight out of nine comparisons give the largest yield for the unpruned, and the sum of the pruned and unpruned is in favor of unpruned for each of the five sets of two plats.

The average yield per acre is 8.3 bu. greater for the unpruned rows.

These experiments and similar ones in previous years suggest that shallow culture is better than deep; that the injury to the roots, which necessarily results from deep culture, reduces the yield; that good crops may be secured in this soil without other cultivation than scraping the surface to destroy weeds, and that the gain from unusually frequent cultivation usually does not equal the extra cost of such cultivation.

RESULTS WITH CORN IN PRUNED AND UNPRUNED ROWS, 1892.

	Row.	Yield of ear corn, pounds.							Yield per acre bu. (75 lb.)
		Plats 1 & 5	Plats 2 & 7	Plats 3 & 8	Plats 4 & 9	Plats 6 & 10	Sum of ten plats.		
							No. ears.	Lb. ears.	
1	Unpruned	9.25	11.37	8.5	10.62	7.75	94	47.49	70.9
2	Pruned	6.25	8	9.87	7.75	9	82	40.87	61
3	Unpruned.....	11.5	13	10.75	11.25	10.5	94	57	85.1
4	Pruned	12.25	8.62	10.75	9.62	10.25	94	51.49	76.9
5	Unpruned.....	5.37	13.25	10.25	10	7.37	74	46.24	69
6	Pruned	7.5	12	11.25	12.37	6.12	90	49.24	73.5
7	Unpruned.....	10	9.37	11.12	12.75	10.62	90	53.86	80.4
8	Pruned	10.12	8.5	9.87	11	9.75	89	49.24	73.5
9	Unpruned.....	14	11.5	10.5	11.87	7.62	89	55.49	82.9
10	Pruned	9	8.12	8.75	13.37	8.25	81	47.49	70.9
11	Unpruned.....	10.5	11.75	11.75	11.5	8.25	87	53.75	80.3
12	Pruned	9.75	12.5	9.37	9.37	8.87	88	49.36	73.7
13	Unpruned	11.87	12.25	12.37	12.25	10.62	101	59.36	88.6
14	Pruned	7.25	8.12	9.37	11	7.25	76	42.99	64.2
15	Unpruned	10.87	9.75	8.62	10.37	9.87	83	49.48	73.9
16	Pruned	7.62	11.87	6.75	11.87	8.75	81	46.86	69.9
17	Unpruned.....	12.25	11.62	8.75	11	9.25	87	52.87	78.9
18	Pruned	8.62	10	10.5	10.75	8.75	78	48.62	72.6
Total { Unpruned		95.61	103.86	92.61	101.61	81.85	799	475.54	710
{ Pruned.....		78.36	87.73	86.48	97.10	76.99	759	426.16	636.2

Experiment No. 89. Corn, Cross-fertilization.

In 1890 sixty-two ears were fertilized with pollen from other stalks, making thirty direct crosses. The cross-fertilization was effected by covering the shoots as soon as they appeared with small cloth bags, and the

tassels from which pollen was wanted with either cloth or paper bags. When the silks had become from two to six inches long, the covering was removed and the pollen, from the desired variety, was applied and the ear again covered. An umbrella was used during the process to shield the silk from pollen falling from the surrounding stalks. In most cases the ears were fairly well filled though some of the cobs were only partially covered with kernels.

In 1892 a small plat was planted from each of 50 of the above ears. Three shoots of each plat were covered and fertilized as were the above. One shoot was fertilized with pollen from its own tassel (self-fertilized) and the other two with pollen of other stalks always from the same plat. The time of ripening and the number and pounds of ears were ascertained for each plat, the artificially fertilized ears marked and a record made of them. The immediate result of a cross often showed little or no evidence of the cross; the product of the immediate result planted usually showed such evidence, the ears varying widely. The ears of the cross-bred corn were frequently larger than the average of the parents and the yield, as shown in *Experiment No. 1*, p. 179, was increased by crossing.

Experiment No. 90. Growth of the Corn Plant; Increase of its Dry Matter.

For four years the rate of growth and the increase of the dry matter in the corn plant have been carefully studied. For three years the composition of the plant has been determined at weekly intervals.

In each year the results have shown a steady increase in the quantity of dry matter until the plant has become fairly mature. In no year has there been more than half the total quantity of dry matter when the plant has reach its full height and not more than 75 per cent of the maximum when the ears were in the soft dough stage. In several cases there has been a slight decrease in the quantity of dry matter as the plant became fully mature. This may be explained by the dropping of leaves or tassels. Aside from this, the evidence seems conclusive that the greatest quantity of dry matter can be secured by not cutting the crop until it is fully ripe. The total weight is greater at an earlier stage because of the greater per cent and quantity of water. In 1892 the plants showed about 90 per cent of water for several weeks while young, and did not fall below 75 per cent of water until Sept. 1st. The lowest percentage found was 56 at the last examination, Oct. 7th.

The rapid growth of the corn plant under favorable conditions has been well illustrated. An increase of 48 inches in height in two weeks has been observed in varieties not especially tall growing. In 1892 a growth of 28 inches was noted in one week.

The chemical analyses, made under direction of Mr. Farrington, chemist of the Station, show that, while there has been a fairly uniform increase in the weight of the ash, protein, fiber, nitrogen free extract,

and the fat or ether extract up to the date when the corn was fairly well matured, the composition of the dry matter shows a steady decrease in the percentage of ash and protein; at first there is an increase and then a decrease in the percentage of fiber; a steady increase in the percentage of nitrogen free extract, and a good deal of variation in the percentage of ether extract with, in general, a considerable decrease until the plant becomes nearly mature.

Aside from questions of digestion and palatability, these observations, as well as trials on a larger scale, suggest the belief that cutting the corn crop before it has become reasonably mature involves a considerable loss.

Experiment No. 134. Corn, Effect of Removing Tassels.

The tassels on every other row of ten rows of Burr's white corn were removed as soon as they appeared, many of them being removed before they had emerged from the leaves. Of another ten rows the tassels on every other row were removed after they were fully out, but before they began to shed pollen.

The following shows no differences that can be attributed to removal of the tassels. The yield when tassels were removed early was slightly decreased, while removing them when well out slightly increased the yield. The total difference between removing and not removing is 10.5 lb. in favor of not removing. This is essentially the same as for 1891, when there was only one lb. difference in yield between 15 rows having no tassels and 15 having them left on :

RESULTS WITH CORN FROM REMOVING TASSELS IN PART, 1892.

No. Rows.	Tassel.	No. ears.	Lb. ears.	Wt. 100 ears.
5	Removed early.....	417	228	54.7
5	Left on.....	432	242	56
5	Removed when out.....	415	232.5	56
5	Left on.....	422	229	54.3
10	Removed.....	832	460.5	55.4
10	Left on.....	854	471	55.2

GENERAL CONCLUSIONS.

Indian corn is the most important grain crop of Illinois. From 5,000,000 to 7,000,000 acres are annually planted to corn each year by Illinois farmers. A small increase in the yield per acre would mean an increase of some millions of dollars in the total value of the crop in the state. The uniform results of the experiments at this Station for five years past indicate that an increase of at least five bushels per acre over average yields may be secured without increase in cost of producing the crop.

There are many good varieties grown in the state. There seems to be no good reason for sending to a distance for new varieties. The claims made by many seedsmen concerning the superiority of varieties

offered by them are gross exaggerations. But there are marked differences in the value of different varieties. For central Illinois, probably for northern Illinois, but less certainly for southern Illinois, it is wise to select a variety with as large ears, if well shaped, as practicable, provided the time of maturity is early enough to reduce danger from frosts in the autumn to a minimum. Neither yield nor feeding value depends on the color of the kernels, or on the smoothness or roughness of the ears.

For the soil and climate at the Station grounds varieties are preferred which have stalks eight to ten feet high, of medium thickness, with short joints and abundant foliage; producing ears at a height of from three feet six inches to four feet; the ears having short shanks. It is preferred that the ears be from eight to ten inches in length, and about two and one-half inches in diameter; nearly uniform in diameter except near the tips; well filled at both ends; with from 16 to 20 rows; the kernels thick rather than thin, somewhat wedge shaped and with little space between the rows. The cob may be from one to one and a quarter inches in diameter.

Some excellent varieties vary from this description in a marked degree in one or more particulars. No one variety has been found which possesses all good qualities. Varieties with remarkably large ears mature too late; very early maturing varieties do not give large yields, nor do those with exceptionally small cobs.

Several experiments make it seem probable that cross-breeding corn will usually increase the yield. It is undetermined how long the improvement may continue.

While the varieties classed as early maturing do not give so large crops as the medium maturing ones, it is often profitable to plant a few acres with such varieties for use in the early autumn, as it is believed that the greater palatability of the new crop corn more than counterbalances the loss from lessened quantity.

The results of many trials suggest that most farmers in central Illinois have attached undue importance to early planting and frequent cultivation, and have done harm by too deep cultivation especially after the corn has made a fair growth; and that they have attached quite too little importance to securing a uniform stand, with at least 12,000 stalks per acre. At the Station good yields have been secured from planting any time in May, and corn planted at a comparatively late date has required less cultivation to keep the ground free from weeds. A good condition of the soil at the time of planting is more important than early planting. Thick planting reduces the size of the ears; but larger yields have been secured in many trials where the number of stalks was at the rate of one kernel each nine inches in rows three feet eight inches apart than from a thinner stand. Little or no gain has been observed from planting in drills compared with planting in hills, with equal numbers of stalks per acre. While "thinning corn" is a troublesome process it is probable its cost would often be abundantly repaid

The weight and good quality of the stover are increased by rather thick planting.

At the Station weeds are the chief enemy of the corn crop. The soil is loose enough to permit ready access to roots, water, and air. Deep plowing, as a rule, does not increase the yield. Deep cultivation of the corn has done harm generally. Unusually frequent cultivation has not been profitable. That method of cultivation seems best which most cheaply prevents the growth of weeds and leaves the surface of the ground comparatively level and smooth, with the least possible interference with the roots.

In a degree greater than the appearance of the plant would indicate, the percentage of solid matter in the corn plant is small during the early period of growth. Both the percentage and the actual quantity of solid matter, and probably the food value of the plant increase until it is nearly or quite mature. It may be profitable in many cases to cut and feed the crop before the kernels have fairly hardened, but there is always a loss of possible value when this is done. The obvious danger of loss from storms and by the dropping of leaves, if the corn is left until fully ripe before it is cut is a sufficient reason for moderately early cutting; but the evidence seems conclusive that much corn is cut when too immature, and this whether it is to be put in a silo or fed as dried fodder.

G. E. MORROW, A. M., *Agriculturist*.

F. D. GARDNER, B. S., *Assistant Agriculturist*.

All communications intended for the Station should be addressed, not to any person, but to the

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